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REBUILDING AGRICULTURAL MARKETS PROGRAM RAMP MARKETING OF VEGETABLES, FRUITS, AND NUTS REPORT

JUNE 2006

REBUILDING AGRICULTURAL MARKETS PROGRAM (RAMP)

RAMP Impact Assessment # 7
Marketing of Vegetables, Fruits, and Nuts

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Vegetable, Fresh and Dry Fruit, and Nut Marketing: RAMP Impact Assessment

List of acronyms

ACTED	Agence d'Aide a'la Cooperation Technique et au Development
ADB	Asian Development Bank
CADG	Central Asia Development Group
CIP	International Potato Center
DAI	Development Alternatives Inc.
DWC	Development Works Canada
FAO	Food and Agriculture Organization of the United Nations
GIA	Grain Industry Alliance International
GRSP	Ghazni Rural Support Program
ICARDA	International Center for Agricultural Research in the Dry Areas
IFDC	International Center for Soil Fertility and Agricultural Development
IP	Implementation Partner
KRA	Kunduz Rehabilitation Agency
MAAHF	Ministry of Agriculture, Animal Husbandry, and Food, Afghanistan
MADERA	Mission d'Aide au Develppement des Economies Rurales en Afghanistan
RAFA	Reconstruction Authority for Afghanistan
RAMP	Rebuilding Agricultural Markets Program
RI	Relief International
RoP	Roots of Peace
RSSA	Reconstruction and Social Services for Afghanistan
STAAR	Social and Technical Association for Afghanistan Rehabilitation
USAID	United States Agency for International Development

Summary

Vegetables, fresh and dry fruits and nuts constitute a very dynamic group of commodities because their consumption increases with income. They provide vitamins and micronutrients that complement carbohydrates and proteins in the diet of Afghan people. Exports of fruits and nuts have been an important share of the exports and the international markets are increasing the demand for dry vegetables and fruits, and nuts. However, there are some factors that limit the growth of domestic and export markets: lack of appropriate infrastructure and transportation; timely availability of inputs such as water, fertilizer and improved seed; inadequate agricultural practices; lack of credit and quality control; poor access to markets, packing and handling practices; and farmer's low entrepreneurial skills. The Rebuilding Agricultural Markets Program (RAMP) and its implementing partners provided market-driven technical assistance to enhance production and marketing practices in eight provinces. The objective of this study is to assess the economic impact of marketing fruits and vegetables under the RAMP during mid 2003 to mid 2006.

The value added for fresh vegetables and fruits domestically sold, result of RAMP technical assistance (RAMP, 2006e), is estimated at US$3.16 million, of which US$1.04 million is for fresh vegetables and US$2.12 million is for fresh fruits. The total value of exports of dry vegetables and fruits, fresh fruits and nuts during 2005 and the first 6 months of 2006 is US$1.37 million, of which 77 percent is for dry fruits, 11 percent is for fresh fruits, 6 percent for nuts and 6 percent for dry vegetables; the main importers are western Europe, Russia, Ukraine, India and the Gulf countries. Thus, the direct impact for both domestic value-added and exports claimed by RAMP in marketing of fruits and vegetables is US$4.56 million.

However, there are other benefits, not quantified in this assessment. Technical capacity has raised quality standards in vegetable and dry fruit processing. RAMP has supported the vegetable dehydration factory in Parwan and the Laboratory of Quality control of Dry Fruits in the Ministry of Commerce. Services provided by these institutions have set precedents and standards for those interested in export markets. The entrepreneurial capacity building provided by RAMP IPs has not fully matured and there are high expectations that exports will continue to grow because the international demand for high-value commodities (almonds, raisins, apricots and grapes) continues to grow and organized producers and wholesales have invested in value added facilities. Stakeholders in the value chain have just begun to realize the value of market intelligence services that provide sustenance for developing business plans and to successfully apply for small and medium-size loans.

Introduction

Farmers commonly identify marketing factors as a key constraint to their income. They usually highlight lack of markets, poor prices, inadequate roads and poor communications to establish contact with potential markets. However, while farmers can usually state clearly their problems they often face difficulties in identifying potential solutions. Farmers are generally highly skilled in agricultural techniques but marketing requires learning new skills, new techniques and new sources of information. Endowed with business and marketing skills farmers will be better able to run their farms profitably (Dixie, 2005).

A market-driven value chain approach includes farmers, collection centers, plants and equipment, knowledge and market contacts. Assembling a chain or possibly a web of partnerships to effectively market agricultural products is a challenge. The organizations or partners involved in value chains, based on their relationships with other partners, are able to work with retailers to supply produce with highest standards. Partners do not find viable to work in the market alone, rather, they feel their strength in their value chain. The rationalization of the market chain aims for more efficiently produced and marketed products which need to be highly reliable (in time) and consistent in quality; it is the process to improve profits, free valuable resources, and simplify operations and supply chains. It does this by rationalizing existing product lines to eliminate or outsource products and product variations that are problem prone, do not fit into a flexible environment, have low sales, have excessive overhead demands, are not really appreciated by customers or have limited future potential.

The ratio of the value of exports to imports from all economic sectors in Afghanistan was 10, 13 and 9 percent in 2002, 2003 and 2004, respectively (ADB, 2005) and the country is a net importer of wheat (FAO/WFP, 2006). Reactivation of agriculture, in which 80 percent of the rural population is involved, can improve food security and contribute to earn badly needed foreign exchange. This can be achieved by identifying demand for agricultural products and linking it with organized farmers' production. Rebuilding agricultural markets requires concerted efforts to rehabilitate infrastructure, rejuvenate production systems and enhance marketing institutions and knowledge management.

The Rebuilding Agricultural Markets Program (RAMP) and its implementing partners provided market-driven technical assistance to enhance production and marketing practices in eight provinces. The objective of this study is to assess the economic impact of the United States Agency for International Development's RAMP on vegetables, fresh and dry fruits, and nuts from mid 2003 to mid 2006. This report includes the estimates of value added of domestic sales of fruits and vegetables and the value of exports.

The first section of this study presents an overview of the horticultural sector and markets; windows of opportunities for further development are highlighted. The second section describes the methods followed for this impact assessment. The third section presents the estimates of the value added of domestic sales of fruits and vegetables and the value of exports; the efforts of RAMP implementing partners (IPs) to demonstrate

best practices on production and marketing practices are highlighted. The fourth section presents some considerations about adoption of improved production and marketing practices, caveats of this assessment, and knowledge management and market intelligence as an aid for sustainability of the horticultural sector. The last section offers concluding remarks of the impact of RAMP in the fruits and vegetables sub-sectors.

Background

Horticulture and Markets

In the late 1970, horticulture accounted for 40 percent of the exports using only 6 percent of the total arable land and 12 percent of the irrigated land (ICARDA, 2003). Horticultural production declined rapidly during the war years but recovered significantly after 1992. A survey carried out by FAO in 1996 revealed that there had been a 24 percent increase in the orchard area under intense production (mostly grapes, apricots, apples, almonds, pomegranate and peach, under irrigation, in rows with specific plant density), from 63,600 ha in 1978 to 78,800 ha in 1996. In contrast, fruit tree species growing on marginal land plantations (predominantly mulberry, walnut, fig, quince, Russian olive and jujube, with intermittent irrigation or rain-fed and random plant density) declined from 33,600 ha in 1978 and 21,700 ha in 1996 (35 percent decrease). Forty-two percent of the orchards in 1996 were less than 15 years old, indicating strong resilience among farmers, replanting and improving their orchards even during the war time. The same FAO survey revealed that the area allocated to vegetables remained constant at 90,000 ha. The major exports were raisins, dried apricots and almonds. Potato, onions, tomatoes and eggplant were the vegetable occupying the largest areas. These high value cash crops contributed to the household income but also diversified the nutritional base of the population.

The 2000 FAO report mentions that 39 percent of the farmers sell their horticultural products at the farm gate, 30 percent sell in the district markets, 25 percent sell in the provincial level markets and only six percent export their produce. There are many farmers who contract crops to traders before harvest. Yields are estimated and the traders supervise the harvesting and packing. The main reason for this practice is the absence of marketing systems and the majority of farmers lack means of transportation to reach district and provincial level markets. Peri-urban district farmers are the most likely to reach these markets and are in better position to negotiate with traders and wholesalers. Farmers close to the borders with other countries have greater chances to export their products at a better price.

Packing standard for horticultural products are lacking; 38 percent of the farmers use jute sacs, 34 percent use wooden crates, 20 percent use baskets and 8 percent use other materials. When asked to rank the horticultural marketing problems, farmers ranked poor roads as a major constraint, followed by limited market information, lack of storage and processing facilities, and lack of farmer cooperatives and limited market bargaining power with traders (FAO, 2000).

Before the war, the Afghan Export Department of the Ministry of Commerce provided information to traders and export-quality criteria were established for horticultural products (mainly raisins). The Agricultural Bank and several cooperatives also provided information to farmers. These services were disrupted by the war. Today, farmers and traders do not have access to centralized market information (FAO, 2004; Swanberg, 2004). A recent field survey revealed that:

> "The market is reasonably integrated across the country, which implies adequate market information systems, although it is not clear how these function, nor how far down the chain the information is shared. There is also deliberate exaggeration about prices and demand, not only within national and regional markets systems, but also within international trading processes. Certainly farmers know their local prices, but may not be aware of prices in other provinces." (Lister and Brown, 2004, p. 17)

However, field observations suggest that there is poor market integration and lack of reliable market intelligence.

According to Mellor (2004), priority in resource allocation should be given to horticulture and particularly to perennial horticulture (vineyards, tree nuts and fruits). The sectoral weighted value added imputed by Mellor to perennial horticulture is 17 percent, with a share in growth of the agricultural sector of 27 percent. He imputes 6 percent of the weighted value added to annual horticulture (vegetables) with an expected share of 9 percent in the agricultural sector. This prognosis is quite encouraging but unless marketing knowledge is put to work, this is unlikely to materialize. It is under this scenario of markets that RAMP has embraced a series of activities to boost horticulture in Afghanistan.

RAMPs support to marketing activities

RAMP, in concert with various IPs has carried out interventions aimed to reinforce production, collection, storage, processing, distribution and sales of horticultural products since the autumn 2003. A market-driven approach has been promoted in these activities in key provinces; interventions comprising infrastructure development, technical assistance and knowledge sharing in best production and marketing practices.

To support marketing activities RAMP and IPs built 142 structures in 13 provinces (Balkh, Beghlan, Ghazni, Helmand, Herat, Kabul, Kandahar, Kapisa, Kunduz, Logar, Nangarhar, Parwan and Takhar; Table 1). These structures are either market collection centers or plants for sorting, processing (some with cooling facilities), packing and quality control. The list is not comprehensive in terms of the activities carried out by the IPs or in terms of the volumes of produce managed per year. Rather, it shows the spread of partners, provinces and groups of crops involved. Supply of clean potato seed was supported with 33 country store rooms built in 5 provinces (Annex 1). Shelf-life of agricultural produce is prolonged by using 42 cold rooms in 21cooling storage systems (2 cold rooms each) in 10 provinces; even though the management of these systems is in an embryonic stage the use of cold rooms has triggered market chain analysis amongst associations of farmers and traders (RAMP, 2006d).

RAMP and IPs have carried out about 1800 on-farm demonstrations in different locations and trained farmers and traders in best practices in the value chains: production, grading, storing, processing, packing and marketing produce (Fig. 1). Business ventures have been pursued with farmers, traders and entrepreneurs to take advantage of identified market niches. Some examples of this market-driven demonstrations and training programs are elaborated below.

Windows of opportunities

During the last 25 years, European demand for dried fruits and vegetables has subtly, though steadily, climbed while available local European supply has been replaced by imported products. Over the years, high labor costs in Europe have forced many British, Irish, Spanish, and Polish producers of dried fruits and vegetables to stop production. This has created processing opportunities for developing rural economies with the appropriate agro-climatic conditions, high production potential, and low operating costs. Annual demand of about 8,500 tons of dried fruits and vegetables remains unfilled mostly because the major producers in the developing world (Egypt, China and India) are too large to effectively re-tool their machinery for comparatively small, 'odd cut' orders, that is diced and sized vegetables (i.e., turnips, spinach, cabbage, courgette, and sun dried tomatoes) to non standard dimensions (Niels, 2006).

Raisins are economically the largest part of the horticultural crops in Afghanistan. They are also its primary export commodity. During the 1960s and 1970s, export of raisins from Afghanistan accounted for 60 percent of the world market (Lister and Brown, 2004). Exports appear to be recovering, and it is estimated that in 2003 the value of raisin exports was 22 percent of the total exports (Table 1). Most of the raisins exported are red (aftabi) and very minor quantities of green (kishmish), black, big and Abjosh raisin. In 2003 about 6600 metric tons were exported to Russia, 400 metric tons to the Czech Republic, 200 metric tons to Germany and 50 metric tons to the UK.

Table 2. Raisin exports as percentage of total exports in Afghanistan, 1996-2003.

	1995-6	1996-7	1997-8	1998-9	1999-0	2000-1	2001-2	2002-3
Total exports ($, 000)	166,060	128,256	144,369	159,225	166,241	137,312	68,541	100,010
Dried fruit exports ($, 000)	1,824	1,292	304	2,909	9,282	16,381	23,328	57,935
Raisin exports ($, 000)	956	780	233	2,104	5,815	11,450	1,127	22,448
Raisin exports/Total exports (%)	0.6	0.6	0.2	1.3	3.5	8.3	1.6	22.4

Modified from Lister and Brown (2004).

Afghan raisins are unique. They are a product of the very arid environment in which they are produced. The hot, bright days of August and September bring about very high sugar percentages (up to 25 percent) in the grape berries. However, the quality of the goods, as well as the structure of marketing, limits both the current export potential, and the value returned to the different actors in the chain, particularly the producer. Alleviating the constraints below could accrue benefits to the different actors involved: i) outdated production approaches, ii) lack of both knowledge and inputs limit yields, iii) lack of capacity and facilities for on-farm processing, iv) few farmer market associations, v) lack of investment in factory processing facilities, and vi) poor packing and marketing internationally (Lister and Brown, 2004).

World imports of almonds are approximately 62,000 metric tons and the world market demand for almonds is said to be expanding at 5 percent per year (Lea, 2006). Nut cultivation and processing is a highly remunerative option to re-establish and expand Afghanistan's position in the world almond market. Yields could be improved by 30 percent and current processing practices could be modernized. An FAO study observed that almonds "are probably the most financially remunerative 'legal' crop in Afghanistan."[1] Afghanistan has traditional marketing relations with India which imports 35 percent of world almond imports and Pakistan which imports 16 percent of world imports. Afghanistan is located next to China which accounts for 18 percent of the worlds imports of almonds. Thus, Afghanistan is close to the majority of the world's import market.

Afghan nuts enjoy brand-recognition and loyalty among Indian consumers. This provides a marketing advantage to Afghan exporters as long as quality is up to expectations. India imports some 22,000 metric tons of almonds, about 50 percent of that from Afghanistan either directly or via Pakistani re-exports. The Indian market for almonds is said to be booming with rapid economic growth (Altai Consulting, 2004), having nearly doubled to 24,000 metric tons between 1990 and 2000.

Afghanistan's higher-value almonds are generally exported whole, in-shell and are sold to final consumers in that form. The shells of these nuts are relatively easy to break and open by hand without tools. These nuts are often termed: "paper-shelled." However, a large portion of Afghan almonds are hard-shelled and mechanical assistance is required to open them. Afghanistan is many years behind the world competition in installing modern almond shelling equipment. Often the nuts are soaked in water and then the shell is cracked with the aid of a hand-held hammer before the nut is extracted from the shell. Soaking in water reduces the quality and value of the kernel. Buyers in India often mention this as a problem with hard-shelled varieties of almonds from Afghanistan. Cracking by hand/hammer results in a larger percentage of broken kernels than expected from modern shelling equipment. Thus, modern shelling equipment is recommended so that Afghanistan can produce a larger percentage of good quality, higher-value kernels from its hard-shell varieties of almonds (Lea, 2006).

Methodology for this assessment

This assessment includes two parts, one is the value added of domestic sales of fresh fruits and vegetables and the other is the exports of fresh and dry fruits, nuts and vegetables.

Value added of produce sold domestically
There is no or negligible processing of fresh vegetables and fruits for the domestic market (canning of vegetable pastes, marmalades, jams, juices, etc.) but there is selection, cleaning, distribution and retailing which are components of the added value of produce

[1] A Review of the Horticultural Marketing and Post-Harvest Conditions in Afghanistan, Dr. Kazim Kemal-ur-Rahim, FAO, Kabul, June 2003.

sold domestically. Henceforth the value of selection, cleaning, distribution and retailing is referred to as added value.

A survey carried out by the end of 2005 to assess the impact of on-farm demonstration plots established between 2003 and 2005 revealed that farmers have net output gains in grains, fruits and vegetables and fiber crops worth US$89.77 million (RAMP, 2006e).[2] Out of this total 33 percent are vegetables (US$29.6 million) and 20 percent are fresh fruits (US$17.9 million).[3]

Table 2 shows the shares of the total value of production in 2004 for fresh fruits and vegetables; 11 and 25 percent of fresh fruits and vegetables is consumed on-farm. On-farm surplus (total production minus home consumption) is sold to the wholesalers and some of it is exported. The difference between total value of production minus home consumption, domestic wholesale and exports is the "unrealized export trade", which basically means undocumented domestic sales and/or exports.[4] Domestic wholesale of fresh fruits and vegetables represent 31 and 57 percent, respectively of the total value of production.

Table 2. Estimated Shares (%) and total value (US$) of Output of fresh fruits and vegetables in Afghanistan.

Commodity group	Home consumption	Domestic wholesale	Export trade	Unrealized export trade *	Total value (US$)
Fresh fruits	11	31	9	49	**342,547,270**
Vegetables	25	57	**	18	**178,821,000**

RAMP estimate.

* This is a share that is comprised by the undocumented domestic sales and/or exports.

** There are no figures reported for exports but it does not mean that they do not exist.

Since our information about the entire market chains is incomplete it is assumed that only on-farm consumption and domestic wholesales are captured by the on-farm survey (RAMP, 2006e). Thus, the 11 percent of home consumption and 31 percent for domestic wholesale of fresh fruits are assumed to comprise the total value of domestic production captured by the on-farm survey (colored area); recalculation of these shares results 26 percent for home consumption and 74 percent for domestic wholesale. Similarly, the 25 and 57 percent of home consumption and domestic wholesale of vegetables is assumed to be the total value captured by the survey; recalculation of shares for home consumption and domestic wholesale is 30 and 70 percent, respectively. The recalculated shares are

[2] About 2700 households were interviewed in 8 provinces (Ghazni, Hilmand, Kabul, Kandhar, Kunduz, Nangarhar and Parwan) to assess the rates of adoption of improved production and marketing practices in 1800 farm demonstrations carried out by the Central Asian Development Group (CADG), the International Center for Agricultural Research in the Dry Areas (ICARDA), Catholic Relief Services (CRS) and Roots of Peace (RoP). The assessment of the cold storage systems, using 42 cold rooms is part of the RAMP's scheme to support market chains (RAMP 2006d).

[3] These percentages were estimated from Participatory Rural Appraisals carried out in 2004 in 35 irrigation schemes rehabilitated by RAMP, comprising 0.45 million hectares (percentages were 42.5 for grains, 20 for fruits, 30 for vegetables and 4.5 for fiber crops). This survey, however, did not capture the shares of nuts or dry fruits because these are crops localized outside of the irrigation schemes rehabilitated by RAMP.

[4] It also means surplus available for export but locally consumed.

multiplied by the value of fresh fruits and vegetables attributed to the on-farm demonstrations to estimate the value added, as explained in the next section.

Exports
Tonnage and sales attributed to RAMP were taken into account for this analysis. Sales records by group (dry vegetables, fresh and dry fruits, and nuts) were analyzed based on quarterly and monthly reports from the various implementing partners (IPs) provided to RAMP's Monitoring and Evaluation Unit.

Results

Value added from domestically sold produce
Multiplying the increased production of fruits due to RAMP on-farm demonstrations (US$17.9 million) by the 70 percent share of domestic wholesale result in the domestic value of sales. This figure multiplied by the average value added for fruits, 16 percent,[5] gives the estimated value added for fresh fruits (US$2.12 million) attributed to additional production due to the on-farm demos (Table 3). Similar computations for vegetables are shown in Table 3, but using a 5 percent of value added for domestically sold vegetables,[6] results in the value added of vegetables, US$1.04 million.

Table 3. Estimation of value added for fresh fruits and vegetables sold domestically.

Comodity group	RAMP's share (US$)*	Domestic wholesale (US$)**	Average value added domestic sales (%) ***	Estimated added value (US$)
Fresh fruits	17.94	13.28	16	2.12
Vegetables	29.60	20.72	5	1.04
Total	47.54	-	-	3.16

* 20 and 33 percent for fresh fruits and vegetables, respectively (PRA 2004).
** 74 and 70 percent for fresh fruits and vegetables, respectively (Table 2).
*** Altai Consulting (2004), Lister and Brown (2005) and RAMP specialists.

The combined estimates of the value added of fresh fruits and vegetables add to US$3.16 million, which is generated by the domestic value chain, and this is claimed by RAMP as a direct impact.[7] This is a conservative estimate because it ignores the shares of exports and the unrealized export trade. The unrealized trade is the result of informal markets and a weak accounting system for domestic sales, among others.

[5] Domestic value added derived from Altai Consortium (2004) and Lister and Brown (2005) averages 32 percent but RAMP specialists estimate a lower figure for the fresh fruits group; the approach followed in this assessment is conservative and 16 percent is used.
[6] Domestic value added derived from Altai Consortium (2004) is 30 percent for tomato but RAMP specialists consider this figure to be extremely high for fresh vegetables, therefore, a 5 percent is used.
[7] It is not possible to quantify the flow of produce benefiting from the market collection centers in Table 1.

Exports by produce groups

Vegetables

The total value of exports of 23 metric tons of dry vegetables by the dehydration factory in Parwan is US$84,500. Farmers are engaged in the factory as contracted farmers and it will take time for the Parwan Growers' Association to qualify for the 40 percent equity allocation in the Parwan Dehydrates Company and start receiving 40 percent of the profits generated by the Company. Investing to build up equity in the company is not easily understood by farmers who prefer short-term planning horizons. Box 1 presents the complexity of spreading RAMP's market-driven approach to rebuilding or opening new markets.

Fresh fruits

Roots of Peace has worked with merchants and farmers to build and test production and marketing channels for fresh, chilled table grapes. Two refrigeration-equipped fresh grape packaging plants have been developed: one in Kandahar and a second in Mirbachakot just north of Kabul. RoP worked with farmers linked with merchants to produce export-quality fresh grapes. It then assisted the merchants to package the fruit and to test its acceptability on several international markets, including Dubai, India, Moscow, Kuwait, and Saudi Arabia. In 2005 the president of the Fresh Fruit Exporters Association of Kandahar (FFEAK) reported that farm level prices had increased 30 percent since the RoP program began to affect purchases through participating merchants.

The total value of sales of 112 metric tons of fresh fruits is US$151,000. Buyers in several international markets are planning to continue purchasing fresh fruit from Afghanistan.

Dry fruits (raisin and apricot)

Green raisins and apricots are highly appreciated and paid at premium prices in India. The sugar content of Afghan raisins and apricots is higher due to the maturation of the fruits before harvesting and because of the intrinsic attributes of the local landraces used by farmers. Both apricots and raisins comprise the largest proportion of dry fruits exported. Roots of Peace has had a very encouraging experience in improvement of production practices, grading and post-harvest treatment and storage, market insertion and promotion of export quality raisins. Raisins and apricots are the typical export dry fruits from Afghanistan. However, there are other dry fruits like raspberry and blue berry that are dried and sold in the local markets. The exports of dry fruits from the 2005 crop added to US$1.05 million (1402 metric tons). Russia and Ukraine are the main importing countries.

Prior to RAMP, the Laboratory of Quality Control of Dry Fruits for the Promotion of Exports in the Ministry of Commerce only provided physical tests and determined sugar content in dry fruits. In September 2004 RAMP provided two quality control laboratories

(Kabul and Kandahar) to carry out tests for aflotoxins[8] and microbiological levels in the dry fruits and nuts in order to obtain a certificate that facilitates exports (103 export certificates have been provided by the laboratories since RAMP upgraded them). Results of these tests are used by the importing countries to accept or reject shipments. Most of the analyses are done for raisin, pistachio and almonds. It is not possible to quantify the impact of upgrading the lab facilities but it is acknowledged that the provision of this certification is of considerable help for the shipments to leave the country and obtain the approval of entry by the importing countries.

Nuts

Historically exports of nuts are the highest earners of foreign exchange in the horticultural sector. Roots of Peace has provided technical assistance to three nut shelling plants (Kandahar, Kabul and Mazar-i-Sharif) to process and pack both almond, pistachio, and dried fruits for export. The three nut merchant/farmers associations which own the plants have invested over US$500,000 in constructing and furnishing their processing plants. RAMP via RoP contributed an additional US$300,000. Assuming these plants operate at 50 percent capacity during their start-up year of 2006-2007, they will process and export some 250 metric tons of shelled almonds with an export value of US$1,750,000.

Realized almonds exports amount only for US$82,000 (16 metric tons), result of the harvest of 2005. This is a very small proportion of annual exports of what Afghanistan. The provinces of Kabul and Kandahar exported at least 10,000 metric tons of almonds last year (Zach Lea, Chief of Party, Roots of Peace, personal communication).

The nuts export market continues to be the most promising export option because of the high quality of the local landrace of almonds cultivated in Afghanistan and the tradition that these nuts have in international markets. Afghan entrepreneurs have started to size this opportunity to modernize their processing plants and increase their annual output at international standards. There appears to be no potential saturation of the market because of the increased production of three plants, the annual rate of increase in world wide demand for almonds exceeds the capacity of the Afghan entrepreneurs to deliver processed almonds to India, the main nut importer in the world (Lea, 2006).

In summary, the marketing of vegetables, fresh and dry fruits, and nuts accrues to US$1,369,000 for the three years of the program (Fig. 2). A major proportion of these exports were to Western Europe, Russia, Ukraine, India and the Gulf countries.

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[8] Aflotoxins are a group of mycotoxins (poisonous substances) produced by fungi known as *Aspergillus flavus*, a common soil fungus. It also grows in improperly stored nuts, grains, dried fruits, spices and certain other foods. Exports of dry fruits and nuts for the US and the European Union require a certificate for acceptable levels of aflotoxins.

Box 1. Vegetable Dehydration Factory in Parwan Province.

The expected international market opportunities for dehydrated vegetables and the development needs in Afghanistan attracted Development Works Canada (DWC), a for-profit development organization, to pursue USAID funding through RAMP to complement its own proposed investment in a vegetable dehydration factory in Parwan province, close to Kabul. The factory is located in an agricultural area with easy access. The business plan of the dehydrated vegetables factory, prepared in early 2004, assumes that it would be self-sufficient, debt-free, and profitable (with a return on investment of about 6 percent) within 3 years.

- DWC would invest approximately 42 percent of the local program costs in Year 1(totaling nearly $2 million), RAMP would fund 58 percent. Additional funding in Year 2 and Year 3 would be dependent on the progress of the project in reaching profitability. Most of the investment from DWC would be for the building, equipment, and machinery, other factory materials, part-salaries/wages of local staff and workers and other infrastructure costs (until the factory operations were profitable).
- About 1200 farmers (from about 25 Parwan villages) with about 320 hectares for vegetables, suitable irrigation resources, proven expertise in crop production, and interest in contract farming and about 400 women involved in sun drying tomatoes would be extended the opportunity to participate in the program. Contracted farmers will be assisted in organizing the Parwan Growers Association. A research farm would be established to conduct trials for new vegetable varieties and to show farmers best practices.
- Once the farmers in the Parwan Growers Association raised $55,000 in funds or like assets and the Association achieved the organizational milestones (determined by a joint MAAHF and RAMP panel) as specified in a Memorandum of Understanding, the Dehydrates Growers Association would receive 40 percent ownership of the Parwan Dehydrates Company (the ownership document, in the meantime, would be held in trust by MAAHF)
- The Parwan Dehydrates Company would be established in Year 2 and would include 60 percent ownership by DWC and 40 percent ownership by the Growers Association. The factory, once it is operating sustainably and profitably, would be handed to the Afghan management.

To date, 925 farmers cultivating 342 ha of vegetables and 315 women have been contracted to supply the factory with specific types of vegetables and sun-dried tomatoes, respectively. Contracted farmers have been supplied with improved seeds, fertilizer, cultivation tools, extension advice, and produce transportation. A laboratory for testing the processed products was fully equipped and the factory's laboratory technician trained in microbiological testing. Over 90 Afghans have been employed in extension, vegetable drying, processing and shipping. About 50 women are employed in the factory's processing line during the day shift. Over 23 metric tons (valued at $84,500) were exported to Europe. An importer visited the factory and was impressed with the high production standards and doubled his order for dehydrated vegetables.

The management of the factory has assessed how to cope with farmers who defaulted to deliver their produce to the factory. After they have received inputs at subsidized cost farmers sold their vegetables at higher prices than the price agreed with DWC. Farmers did not appreciate that the factory's guaranteed product price and staggered crop cycles would guarantee a much higher and dependable income in the long-run. DWC management has relied in a more thorough extension program with more frequent meetings with contracted farmers to link the contract farming with the membership into the Parwan Growers Association to invest in the Parwan Dehydrates Company. Once this issue is resolved the production is expected to climb to 400 metric tons per year (about 80 percent capacity).

Source: Niels (2006).

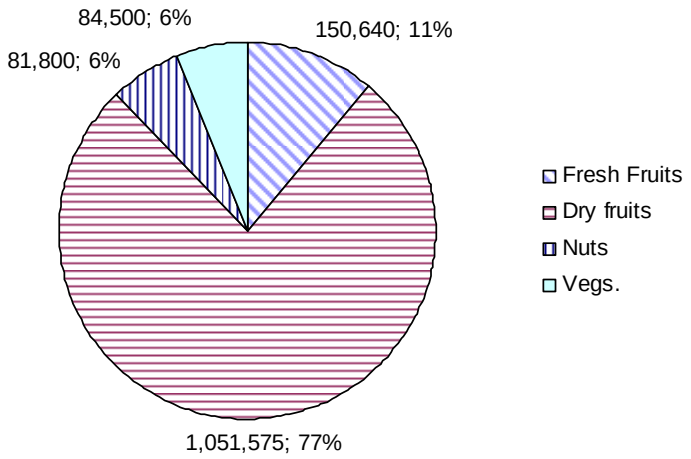

Figure 2. Exports of vegetables, fresh and dry fruits, and nuts under RAMP.

RAMP's impact
The value added from domestic sales of fresh fruits and vegetables derived from increased production in the on-farm demonstrations (US$3.16 million) in one hand and the value of exports of RAMP's implementing partners (US$1.37 million) in the other add to US$4.53 million claimed by RAMP.

Discussion

Adoption of improved production and marketing practices
Adoption rates for improved technology and marketing practices between 2003 and 2005 is about 18 percent for vegetables and 13 percent for fruits (RAMP, 2006e). The most frequent practices were the use of pesticides and fertilizer, and proper seedling management (in the case of vegetables). Improved harvesting, grading, packing and storage were the least frequent practices adopted by farmers. Slightly higher rates of adoption of improved practices for vegetables in the three years could be related to findings that show that farmers are shifting emphasis from fruits to vegetables in terms of land allocation (FAO, 2000 and 2004). Adoption and diffusion of technological innovations in perennial crops take longer than those innovations in annual crops, they are more complex and often farmers have a preference for short-term returns. It was not possible to separate the benefits accrued by production improvement practices, including input procurement by dealers, and the benefits accrued from improved marketing practices. As such, the incremental benefits captured by the on-farm demonstrations survey (RAMP, 2006e) and those estimated from sales of farmers and traders collaborating with the IPs correspond to the combined factors in the program for rebuilding agricultural markets.

The exports of fruits and vegetables are direct benefits of RAMP's technical support in production and marketing practices. Other direct benefits are captured in the impact assessment of on-farm demos for cereals, fruits and vegetables sold domestically (RAMP, 2006e) of which the value added is estimated. Unfortunately, the benefit of the 142 market collection centers cannot be estimated, as there are no records of its usage. Rationalization of the market chain, result of organizing associations of farmers and traders, development of business plans, travel abroad to explore possible market insertions, and technical assistance in markets are not included in the impact valuation attributed to RAMP but are instruments that contribute to output growth and their benefit is indirect through increased sales.

Knowledge sharing and market intelligence
The knowledge transfer to empower associations of farmers and traders to rationalize the value chain is an ongoing process. Three years are not enough to assess the effects of these activities. However, the fact that in many instances, the organized farmers and traders have invested their own funds means that the learning experience is taken seriously. Rational investors would seek the highest possible return to their investment, in this sense, they have a vested interest in making these activities most viable in financial terms. This is the case of organized farmers who have begun and/or enhanced export activities, as well as those engaged in cold storage as a means to prolong the life-shelf of produce that can be sold in at premium price in the off season (RAMP, 2006h).

Market intelligence and business culture needs to be embedded in the market place beyond networking. Seasonal price indices should be developed and made available to all actors in the value chain to plan production and ascertain risks associated with marketing decisions. Even though farmers appear to be knowledgeable of local prices (Lister and Brown, 2004) there is need to develop business plans eligible for financing (documented historical prices and practices, expectations, local and export markets, contingency plans, etc.) for the majority of small farmers, and possibly traders and processors, who would like to intensify and expand their operations. There is need to encourage entrepreneurial capacity for small and medium-size enterprises that could help to expand the horticultural markets (see RAMP, 2006i). A flexible approach for production and marketing is required to adapt to possible changes in consumers' preferences in the importing countries and not to rely only on the fame Afghan products have gained in the last decades.

Conclusions

Horticultural production and marketing in Afghanistan is increasing thanks to the market-driven approach that has identified and penetrated markets through an organized network of traders, retailers and farmers for both the domestic and export markets. Collection and market centers has been built, training on selection and grading, processing and packing has been provided, and organized farmers and entrepreneurs have been taught the intricacies of exporting produce. Production concerns have been addressed, based on needs, by participating farmers and traders to enhance and sustain the timely production of quality products. These efforts have successfully contributed to rebuild agricultural markets.

While US$4.53 million estimate for RAMP's impact in improving production and marketing practices may appear low for a national program to rebuild agricultural markets this figure is very conservative for the value added for domestic sales of fresh fruits and vegetables which is US$3.16 million and it ignores the share that could have been sold in the informal market either domestically or outside of Afghanistan. The exports of RAMP's implementing partners (US$1.37 million) represent the beginning of an expanding stream of income in the agricultural sector for the years to come.

The rationalization of the market chain has been an ongoing process for all the stakeholders in the value chain collaborating with RAMP. The message being that the link between existing demand for agricultural products with organized supply is a necessary condition for sustainable growth. This is a practice that needs to be nurtured with better and more organized efforts. Market intelligence needs to be improved for better marketing decisions and to enhance production planning. The identification of market niches and actions needed to add value to produce are likely to expand for the benefit of all actors in the value chain. RAMP has set the stage for sustainable growth of horticultural markets in Afghanistan.

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Table 1. Marketing related infrastructure.

IP	MARKET CENTER / MCC	DESCRIPTION OF WORKS	CROPS	Province (No. Structures)
ACTED	MCC Structure	Construction of a market collection center	Fruits, grapes, raisins, vegetables and nuts	Parwan (4), Kabul (1), Kapisa (1)
CADG	MCC Structure	Construction of a market collection center	Fruits, vegetables and nuts	Helmand (6), Kandahar (4)
DAI	MCC Structure	Construction of a 50m² / 125m³ market collection center	Vegetables and grains	Baghlan (4)
DWC	MCC Structure	Construction of a 600m² vegetable dehydration factory and 4 MCC	Vegetables and herbs for export	Parwan (5)
GIA	Market Center	Construction and installation of a 8.80 MT galvanized multi-purpose holding bin for storing, bagging, and fumigation of grains.	Cereal grains (wheat)	Kunduz (27), Helmand (14), Nangarhar (6), Parwan (4), Ghazni (5), Kabul (2), Kapisa (1), Hirat (1)
GRSP	MCC Structure	Construction of a 37m² / 92.5m³ market collection center	Nuts, fruits, grapes / raisins, and vegetables	Ghazni (2)
KRA	MCC Structure	Construction of a 30m² / 75m³ Market collection center	Vegetables, rice and melon	Kunduz (2)
MADERA	MCC Structure	28M² market collection center / store	Vegetables and fruits	Nangarhar (2)
RAFA	MCC Structure	Construction of a market collection center	Fruits, grapes, raisins, vegetables and nuts	Parwan (4)
RI	MCC Structure	Construction of a 24M² / 60m³ market collection center	Vegetables and fruits	Nangarhar (19)
RoP	MCC Structure	Construction of a 20m² / 50m³ market collection center	Fruits, grapes, raisins, vegetables and nuts	Parwan (7), Kandahar (6), Kabul (5), Ghazni (2), Logar (2), Zabul (2), Kabul (1)
RSSA	MCC Structure	8 stall market collection center 158.20 m²	Vegetables and fruits	Nangarhar (1)
STAAR	MCC Structure	43.9M² market collection center	Vegetables and fruits	Nangarhar (2)

Code of Implementing Partners (IPs) is in the list of acronyms.

MCC= market collection center.

Annex 1. Activities Supporting RAMP's Market-Driven Approach

The RAMP's market-driven approach to rebuilding markets infrastructure related to the improvement of agricultural input supply[9], as well as the productivity and output of agricultural products. In cooperation with its implementing partners RAMP has developed a network of partnerships to procure inputs, test and transfer technological innovations in different provinces. Unless stated otherwise, the economic impact of these experiences were measured in the on-farm impact assessment (RAMP, 2006e).

Agricultural Input Dealer Training. This training was implemented by the International Center for Soil Fertility and Agricultural Development (IFDC). The purpose was to contribute to develop a more efficient and effective agri-inputs marketing system based upon private sector investment. Emphasis was given to the enhancement of business skills of agri-dealers and development of business linkages with regional suppliers of agricultural inputs. IFDC trained dealers of agricultural inputs, extensionists, non-government organizations and farmers regarding the use of fertilizer and agri-chemicals, safe storage and transport, as well as agribusiness practices that reduce transaction costs. Fertilizer in Afghanistan increased from 170,000 metric tons in 2002 to 285,000 metric tons in 2004 and 415,000 metric tons in 2005 (no data is available for 2003, which was largely affected by drought). This training altogether with other IPs demonstrations and extension programs, compounded with the incorporation of returnees working in agriculture, higher rainfall in 2005, availability of more irrigation after the rehabilitation of dams and canals, and improved road network. Because of the complex interaction of these factors it is difficult to ascertain the direct effect of the training program; however, there is no question that this training has had a synergistic effect with other RAMP's activities.

Vegetable production

Clean Potato Seed Production. This project, managed by ICARDA in cooperation with the International Potato Center (CIP) was designed to i) produce, multiply and maintain health standards of seed potato of existing and newly introduced improved varieties, ii) train seed producers (progressive farmers), seed program professionals, and government staff in seed production, storage and marketing and iii) set up in vitro seed production facility (tissue culture laboratory and screen house) to produce good quality seed, iv) create potato seed storage facilities and v) establish an "organized market chain" to sell locally produced formal and informal seed and ware potato in domestic and regional markets.

- Technical assistance was provided to seed producer groups in Ghazni, Helmand, Kunduz, Nangarhar and Parwan provinces. About 3100 metric tons of clean potato seed were produced at the end of the second year and yields of demonstrations using clean seed were 46 percent higher than locally available seed.
- Seventy-two demonstrations were carried out in 2003-2004 and 2004-2005 in 5 provinces with yields 40 percent higher than using locally available seed.

[9] Irrigation and roads are reported in RAMP (2006a and 2006b, respectively and cold storage in RAMP (2006h).

- Seed/ware potato production was introduced in Nangarhar in during 2004 allowing the production of two crops per year, therefore, contributing to increase farmers' income with good quality seed during the aphid free period.
- A tissue culture laboratory was established in Kabul and personnel of the MAAHF were trained in tissue culture, micro-propagation and mini-tuber production techniques.
- Farmers stored 310 metric tons of clean seed potato seed during 2004-2005 in 33 country store rooms (each with 20 metric tons capacity).
- Farmers and extensionists were trained on clean seed production and marketing to boost potato as a profitable cash and food crop. Five publications in local languages were produced and distributed. Three radio programs on potato production and marketing were produced and broadcast by more than 50 local radio stations, reaching over an estimated 15 million listeners.

Village Based Seed Enterprises. This project, managed by ICARDA, developed 21 village-based seed enterprises (VBSE) in the provinces of Ghazni, Helmand, Kunduz, Nangarhar and Parwan to produce and multiply improved seed of wheat, rice, mungbean, potato and tomato. Each VBSE is comprised by 10-15 members as a seed producers association that pulls financial resources to acquire inputs such as fertilizer, agrochemicals and machinery (seed cleaner and tractors). Services provided by the VBSE include seed production, cleaning, storage and marketing; VBSE members were trained in seed demand assessment, record keeping, business plans and best practices in seed multiplication. About 6100 metric tons of improved seed have been produced and sold, of which 3500 metric tons was wheat, 700 metric tons was rice and the remaining 1900 metric tons was comprised of potato, mungbean and tomato.

Demonstration plots. CADG, CRS, ICARDA and RoP carried out about 1800 demonstrations in farmer's fields in 8 provinces to facilitate rapid adoption and diffusion of recommended agricultural and marketing practices during 2003 to 2005. Improved management practices (i.e., fertilizer, improved seed, and integrated disease and pest control, plus assistance of extension agents) in wheat, rice, potato, tomato, mungbean, okra, cotton, peanut, and onion, as well as melons, pomegranate, grape and almonds were compared with farmers' traditional practices. In general, productivity increases between 30 and 50 percent with the recommended management practices. Selected produce of higher quality with appropriate packing supplied to processors or exporters has made a difference to farmers who have adopted better marketing practices.

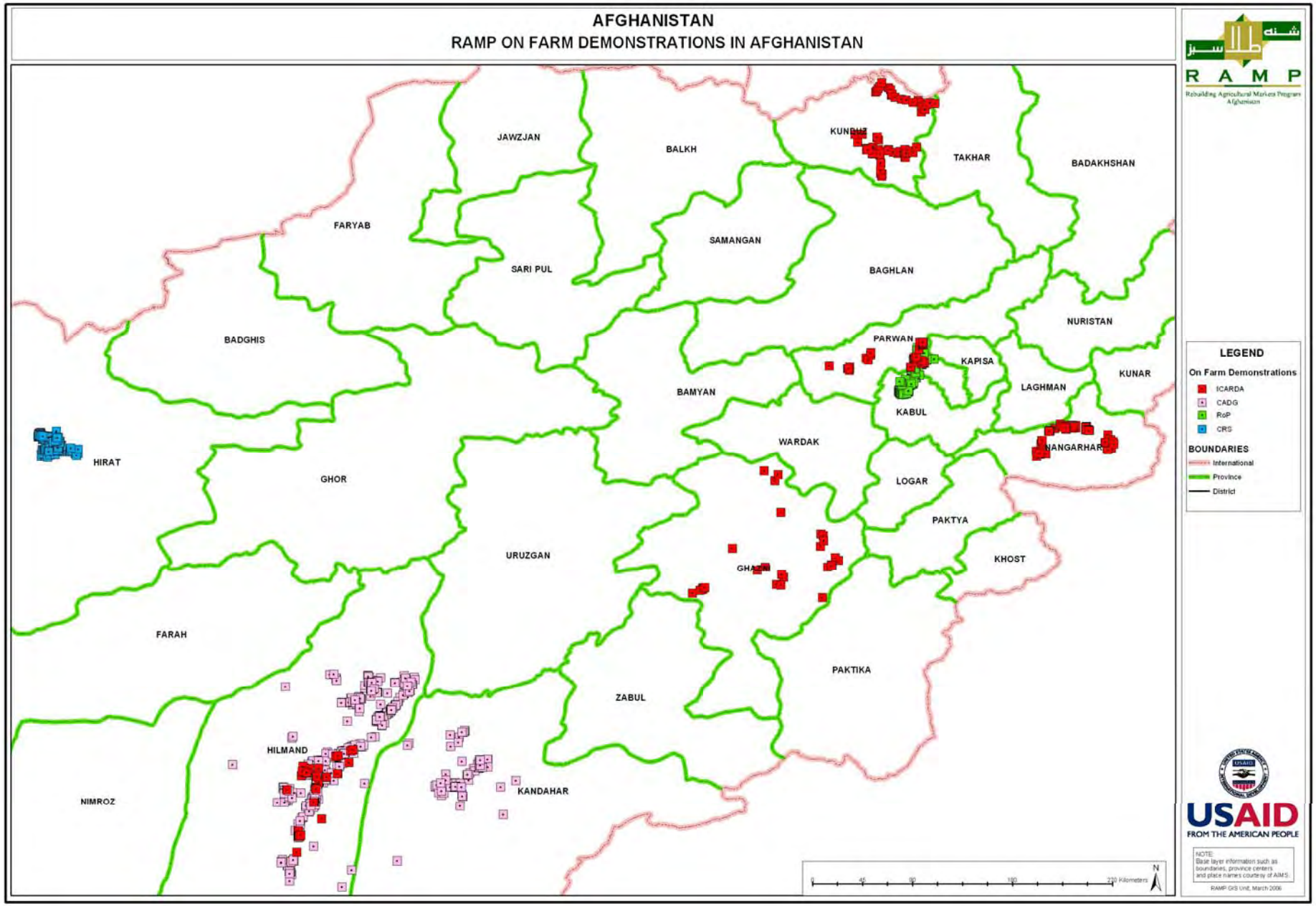
Protected agriculture for cash crop production in water deficit areas. This project, managed by ICARDA, has promoted the adoption of affordable and sustainable protected agricultural systems to produce high value crops, using scarce water more efficiently, by establishing a central demonstration and training site within Kabul and by installing simple greenhouse structures at selected pilot sites with participating farmers. A typical greenhouse is 29 meters by 9 meters and 3 meters high, with a water pump, power generator, water tank, pipes, drip irrigation system and a well, with a cost of US$2850. Twenty percent of the cost is the contribution of participating farmers. The average annual gross income of the greenhouse, with two off-season crops of cucumbers is about

US$2800 and the annual cost of production is about US$1600. Thus, the net profit is about US$1140. Currently there are 71 greenhouses installed by ICARDA in 5 provinces, of which 41 are demonstration greenhouses (without farmer investment) and 30 are private greenhouses with 20 percent of the cost paid by farmers. The CADG, another IP, has installed 36 similar demonstration greenhouses in Helmand and Kandahar.

Fruits (grapes and nuts)

Grape is the most important fresh fruit for Roots of Peace. Technical assistance to farmers was provided on canopy management, applications of sulfur and giberelic acid, crop protection against anthractose, and use of fertilizer. Identification of pests and diseases, as well and preventive and curative measures. Training on mechanical control of a grape insect called cicada (*Phylloxera sp*) was implemented and two demonstrations of vine propagation nurseries under drip irrigation have been carried out in the Shamali Plain. Assistance was provided to farmers to rehabilitate abandoned green raisin drying sheds, and trained women on green raisin production and marketing. Improved technology for head pruning and trellising, removal of secondary shoots and pinching of shoot tops was introduced. Musk melon demonstration trials with different varieties have been established and monitored in Kandahar. The purpose of these trials is the give options for diversification of cash-crop production with resulting higher and more stable incomes.

The nut project of Roots of Peace assists Afghan farmers increase their yield per tree of almonds. Activities began in October 2005 oriented to learning what is possible in terms of changing farmers' production practices and the impact on per tree yield, ultimately, land productivity. Thus, this year's program is pilot in nature. Once experience has been gained at this pilot stage, the tested techniques should be widely disseminated though publications and expanded programs. Due to security concerns, the program was not active in the major almond producing regions near Kandahar. However, initial contact with almond farmers in Zabul province indicates that their trees are producing a fraction of what is considered to be normal. The project has worked with almond farmers in the Ghorband Valley, north of Kabul, and Samangan and Balkh provinces. The cultural practices promoted by the nut production program are: tree pruning, pollination via bees, insect control, fertilization and inter-crop management. Experience to date indicates that productivity per tree can be increased 30 to 50 percent when innovations are adopted.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RAMP ON FARM DEMONSTRATIONS IN AFGHANISTAN
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NOTE:
Base layer information such as boundaries, province centers and place names courtesy of AIMS.
RAMP GIS Unit, March 2006